

## Science & Technology

### IISc Develops 3D Hydrogel to Advance TB Research

**Context:** Researchers at the Indian Institute of Science (IISc), Bengaluru, have made a significant breakthrough in tuberculosis (TB) research. The Department of Bioengineering has created a new 3D hydrogel culture system that mimics the lung environment in mammals. This innovative system is expected to enhance the understanding of TB infections and improve the evaluation of drug efficacy.



### Significance of the 3D Hydrogel Culture

- ❖ Traditional methods of studying Mycobacterium tuberculosis (Mtb) infections often rely on two-dimensional culture plates, which do not accurately replicate the three-dimensional structure of lung tissues, resulting in less reliable data.

- ❖ The new 3D hydrogel culture system developed by IISc addresses this issue by incorporating collagen, a vital component of the extracellular matrix (ECM) of lung cells, to create a more realistic model of lung tissue.

### Advantages of the 3D Hydrogel System

- ❖ This advanced 3D hydrogel system offers several benefits over traditional methods. It creates a soft mesh that allows immune cells, specifically human macrophages, to interact with TB bacteria in a manner that closely resembles interactions within the human lung.
- ❖ Additionally, this system can sustain mammalian cell cultures for up to three weeks, significantly longer than the typical 4-7 days in conventional cultures. This extended culture period is crucial for studying Mtb, a slow-growing pathogen.

## Personalities in News

### Sucheta Kripalani: A Pioneer in Indian Politics

**Context:** Sucheta Kripalani holds a significant place in Indian political history as the first woman to serve as Chief Minister of an Indian state, Uttar Pradesh. Her tenure lasted from October 2, 1963, to March 13, 1967, a period marked by significant political changes, primarily due to the Kamaraj Plan, which sought to rejuvenate Congress leadership across various states.



### Rise to Leadership

- ❖ Sucheta Kripalani's ascension to the position of Chief Minister was driven by a unique sequence of events and her established reputation as an effective leader.
- ❖ The idea of her becoming Chief Minister was initially proposed by J. B. Kripalani during Chandra Bhanu Gupta's visit. This proposal gained momentum through discussions among the top ranks of the Congress party.

- ❖ The final decision was made at a Congress Legislative Party (CLP) meeting in Lucknow, where MLAs cast their votes anonymously. Sucheta Kripalani won the position by defeating Kamalapati Tripathi with a margin of 99 votes.

### Contributions and Vision as Chief Minister

- ❖ During her tenure, Sucheta Kripalani implemented several progressive policies and reforms.
- ❖ Key initiatives included making education free for girls up to Class 10, establishing two new colleges, and increasing employment opportunities for Scheduled Castes.
- ❖ She also tackled safety concerns, particularly in the Chambal Valley, and oversaw the establishment of projects like the UP Awas Vikas Parishad to enhance infrastructure development.
- ❖ Her administration focused on combating corruption and emphasized the importance of integrity in public service.

## Environment

### World's First Asian King Vulture Center – Uttar Pradesh

**Context:** Uttar Pradesh has commenced the construction of the world's first center dedicated to the conservation and breeding of the Asian king vulture, also known as the red-headed vulture, in Maharajganj. This species has been listed on the International Union for Conservation of Nature's Red List since 2007 due to its critically endangered status.



### Significance of the Asian King Vulture

- ❖ Once widespread across India, the population of the Asian king vulture has drastically declined due to diclofenac poisoning.
- ❖ This non-steroidal anti-inflammatory drug, used on livestock, proved fatal to vultures feeding on the carcasses.

- ❖ Listed under Schedule 1 of the Wildlife Protection Act of 1972, the Asian king vulture necessitates immediate conservation efforts to prevent its extinction.

### Objectives and Facilities at the Centre

- ❖ The Jatayu Conservation and Breeding Center is equipped with advanced technology to monitor and care for the vultures around the clock.
- ❖ The center employs specialized staff, including a scientific officer and a biologist, and implements strict security measures such as CCTV surveillance to ensure minimal human interference.
- ❖ The vultures are nurtured back to health with a special diet and a controlled breeding environment, fostering their recovery and eventual resurgence.

## Index & Report

### World Investment Report 2024: India's FDI Falls by 43% in 2023

**Context:** In 2023, global Foreign Direct Investment (FDI) experienced a 2% decline compared to 2022. Significant drops were observed in countries like India, China, France, Australia, and the USA. The 2024 World Investment Report from the United Nations Conference on Trade and Development (UNCTAD) provides a detailed analysis of these trends.



#### Decline in FDI to India

- ❖ India faced a substantial decrease in FDI, with inflows falling from \$49 billion in the previous year to \$28 billion in 2023, marking a 43% reduction.
- ❖ Consequently, India's global ranking for FDI receipts dropped from eighth place in 2022 to fifteenth place in 2023.

- ❖ Despite this decline, Indian projects continue to attract significant foreign project financing and new construction investments.

#### Sector-Specific Impacts

- ❖ The reduction in FDI has varied impacts across different sectors. International project finance, crucial for infrastructure, decreased by 23%, and cross-border mergers and acquisitions dropped by 46%.
- ❖ This latter trend is particularly significant as mergers and acquisitions are essential for FDI in emerging economies like India. Overall, FDI to poorer countries fell by 7% to \$867 billion, with varying effects across regions.
- ❖ For instance, FDI to developing Asia decreased by 8%, reaching \$4 billion. Notable declines were also observed in China and related trends in West and Central Asia.



PW Web/App: <https://smart.link/7wwosivoicgd4>

For more such content, subscribe to our Telegram Channel [https://t.me/pw\\_upsc](https://t.me/pw_upsc)